

## RECOMMENDATION 9 (JCOMM-II)

### **MODIFICATIONS TO THE INTERNATIONAL MARITIME METEOROLOGICAL TAPE (IMMT) FORMAT AND MINIMUM QUALITY CONTROL STANDARDS (MQCS)**

THE JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY,

#### **Noting:**

- (1) *Manual on Marine Meteorological Service* (WMO-No. 558) Volume 1, Appendix 1.13,
- (2) *Manual on Marine Meteorological Services* (WMO-No. 558) Volume 1, Appendix 1.15,
- (3) Final Report, First Session of the JCOMM Expert Team on Marine Climatology, JCOMM Meeting Report No. 32,

**Recognizing** that the current Minimum Quality Control Standards (MQCS-IV) do not extend to the additional elements introduced for the VOSClm Project at JCOMM-I,

#### **Considering:**

- (1) That the IMMT format remains the primary format for the exchange of marine climatological data, for both the MCSS and the VOSClm Project,
- (2) The importance of the Minimum Quality Control Standards to the quality of the data contained in the MCSS data archives,
- (3) The importance to the Global Collecting Centres of maintaining both the IMMT and the MQCS up to date,

#### **Recommends:**

- (1) That the amendments to the *Manual on Marine Meteorological Services* and the *Guide to Marine Meteorological Services* as detailed in Annexes 1 and 2 to this recommendation be approved, and included in the appropriate appendices in the *Manual* and *Guide*;
- (2) That the new version (IMMT-3) of the IMMT format be implemented generally for all data collected as from 1 January 2007;
- (3) That the new version of the Minimum Quality Control Standards (MQCS-V) be also implemented generally for all data collected from 1 January 2007;

**Requests** the Expert Team on Marine Climatology to continue to review the implementation and value of the revised format and quality control standards, to provide technical assistance to the Members/Member States concerned as required and to propose further amendments to the format and standards as necessary;

**Requests** the Secretary-General of WMO to provide appropriate technical advisory assistance to Members/Member States concerned, as required, in the implementation of the revised format and standards.

## Annex 1 to Recommendation 9 (JCOMM-II)

**AMENDMENTS TO THE MANUAL ON MARINE METEOROLOGICAL SERVICES AND  
GUIDE TO MARINE METEOROLOGICAL SERVICES****LAYOUT FOR THE INTERNATIONAL MARITIME METEOROLOGICAL TAPE (IMMT)****[VERSION IMMT-3]**

<i>Element Number</i>	<i>Character Number</i>	<i>Code</i>	<i>Element</i>	<i>Coding procedure</i>
1	1	i <sub>T</sub>	Format/temperature indicator	3=IMMT format with temperatures in tenths of °C 4=IMMT format with temperatures in halves of °C 5=IMMT format with temperatures in whole °C
2	2-5	AAAA	Year UTC	Four digits
3	6-7	MM	Month UTC	01 - 12 January to December
4	8-9	YY	Day UTC	01 - 31
5	10-11	GG	Time of observation	Nearest whole hour UTC, WMO specifications
6	12	Q <sub>c</sub>	Quadrant of the globe	WMO code table 3333
7	13-15	L <sub>a</sub> L <sub>a</sub> L <sub>a</sub>	Latitude	Tenths of degrees, WMO specifications
8	16-19	L <sub>o</sub> L <sub>o</sub> L <sub>o</sub> L <sub>o</sub>	Longitude	Tenths of degrees
9	20		Cloud height (h) and visibility (VV) measuring indicator	0 - h and VV estimated 1 - h measured, VV estimated 2 - h and VV measured 3 - h estimated, VV measured
10	21	h	Height of clouds	WMO code table 1600
11	22-23	VV	Visibility	WMO code table 4377
12	24 applicable	N	Cloud amount	Oktas, WMO code table 2700; show 9 where
13	25-26 00 or 99	DD	True wind direction	Tens of degrees, WMO code table 0877; show where applicable
14	27	i <sub>w</sub>	Indicator for wind speed	WMO code table 1855
15	28-29 hundreds  indicated accordingly; units	ff	Wind speed	Tens and units of knots or meters per second, omitted; values in excess of 99 knots are to be in units of meters per second and i <sub>w</sub> encoded the method of estimation or measurement and the used (knots or meters per second) are indicated in element 14
16	30	s <sub>n</sub>	Sign of temperature	WMO code table 3845
17	31-33	TTT	Air temperature	Tenths of degrees Celsius
18	34 temperature	s <sub>t</sub>	Sign of dew-point temperature	0 - positive or zero measured dew-point 1 - negative measured dew-point temperature 2 - iced measured dew-point temperature 5 - positive or zero computed dew-point

temperature

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6 - negative computed dew-point temperature

7 - iced computed dew-point temperature

19	35-37	T <sub>d</sub> T <sub>d</sub> T <sub>d</sub>	Dew-point temperature	Tenths of degrees Celsius
20	38-41	PPPP	Air pressure	Tenths of hectopascals
<i>Element Number</i>	<i>Character Number</i>	<i>Code</i>	<i>Element</i>	<i>Coding procedure</i>
21	42-43	ww	Present weather	WMO code table 4677 or 4680
22	44	W <sub>1</sub>	Past weather	WMO code table 4561 or 4531
23	45	W <sub>2</sub>	Past weather	WMO code table 4561 or 4531
24	46	N <sub>h</sub>	Amount of lowest clouds	As reported for C <sub>L</sub> or, if no C <sub>L</sub> cloud is present, for C <sub>M</sub> , in oktas; WMO code table 2700
25	47	C <sub>L</sub>	Genus of C <sub>L</sub> clouds	WMO code table 0513
26	48	C <sub>M</sub>	Genus of C <sub>M</sub> clouds	WMO code table 0515
27	49	C <sub>H</sub>	Genus of C <sub>H</sub> clouds	WMO code table 0509
28	50	s <sub>n</sub>	Sign of sea-surface temperature	WMO code table 3845
29	51-53	T <sub>w</sub> T <sub>w</sub> T <sub>w</sub>	Sea surface temperature	Tenth of degrees Celsius
30	54		Indicator for sea-surface temperature measurement	0 - Bucket thermometer 1 - Condenser inlet 2 - Trailing thermistor 3 - Hull contact sensor 4 - "Through hull" sensor 5 - Radiation thermometer 6 - Bait tanks thermometer 7 - Others
31	55		Indicator for wave measurement	0 - Wind sea and swell estimated 1 - Wind sea and swell measured 2 - Mixed wave measured, swell 3 - Other combinations measured 4 - Wind sea and swell measured 5 - Mixed wave measured, swell 6 - Other combinations measured 7 - Wind sea and swell measured 8 - Mixed wave measured, swell 9 - Other combinations measured
			estimated	Shipborne wave recorder
			estimated	Buoy
			estimated	Other measurement system
			estimated	estimated
32	56-57	P <sub>w</sub> P <sub>w</sub>	Period of wind waves or of measured waves	Whole seconds; show 99 where applicable in accordance with Note (3) under specification of P <sub>w</sub> P <sub>w</sub> in the Manual on Codes
33	58-59	H <sub>w</sub> H <sub>w</sub>	Height of wind waves or of measured waves	Half-meter values. Examples: Calm or less than 1/4m to be encoded 00; 3 1/2m to be encoded 07; 7m to be encoded 14; 11 1/2m to be encoded 23
34	60-61	d <sub>w1</sub> d <sub>w1</sub>	Direction of predominant swell waves	Tens of degrees, WMO code table 0877; encoded 00 or 99 where applicable. Blanks = No observation of waves attempted
35	62-63	P <sub>w1</sub> P <sub>w1</sub>	Period of predominant swell waves	Whole seconds; encoded 99 where applicable (see under element 32)

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36	64-65	H <sub>w1</sub> H <sub>w1</sub>	Height of predominant swell waves	Half-meter values (see under element 33)
37	66	I <sub>s</sub>	Ice accretion on ships	WMO code table 1751
38	67-68	E <sub>s</sub> E <sub>s</sub>	Thickness of ice accretion	In centimeters
39	69	R <sub>s</sub>	Rate of ice accretion	WMO code table 3551
40	70		Source of observation	0 - Unknown 1 - Logbook 2 - Telecommunication channels 3 - Publications 4 - Logbook 5 - Telecommunication channels 6 - Publications

National

International  
data exchange

*Element Number*   *Character Number*   *Code*   *Element*

*Coding procedure*

41	71		Observation platform	0 - unknown 1 - Selected ship 2 - Supplementary ship 3 - Auxiliary ship 4 - Automated station/data buoy 5 - Fixed sea station 6 - Coastal station 7 - Aircraft 8 - Satellite 9 - Others ....
42	72-78 follows:		Ship identifier	Ship's call sign or other identifier encoded as  7 characters call sign Columns 72–78 6 characters call sign Columns 72–77 5 characters call sign Columns 72–76 4 characters call sign Columns 72–75 3 characters call sign Columns 72–74
43	79-80 assigned by (ISO)		Country which has recruited the ship	According to the two-character alphabetical codes the International Organization for Standardization
44	81		National use	
45	82		Quality control indicator	0 - No quality control (QC) 1 - Manual QC only 2 - Automated QC only /MQC (no time-sequence checks) 3 - Automated QC only (inc. time sequence checks) 4 - Manual and automated QC (superficial; no automated time-sequence checks) 5 - Manual and automated QC (superficial; including time-sequence checks) 6 - Manual and automated QC (intensive, including automated time-sequence checks) 7 & 8 - Not used 9 - National system of QC (information to be furnished to WMO)
46	83	i <sub>x</sub>	Weather data indicator	1 - Manual 4 - Automatic   If present and past weather data  Code tables 4677 and 4561 used 7 - Automatic   If present and past weather data  Code tables 4680 and 4531 used

included

included

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47	84	i <sub>R</sub>	Indicator for inclusion or omission of precipitation data	WMO code table 1819
48	85-87	RRR	Amount of precipitation which has fallen during the period preceding the time of observation, as indicated by t <sub>R</sub>	WMO code table 3590
49	88	t <sub>R</sub>	Duration of period of reference for amount of precipitation, ending at the time of the report	WMO code table 4019
50	89	s <sub>w</sub>	Sign of wet-bulb temperature	0 - positive or zero measured wet-bulb 1 - negative measured wet-bulb temperature 2 - iced measured wet-bulb temperature 5 - positive or zero computed wet-bulb 6 - negative computed wet-bulb temperature 7 - iced computed wet-bulb temperature
51	90-92	T <sub>b</sub> T <sub>b</sub> T <sub>b</sub>	Wet-bulb temperature	In tenths of degree Celsius, sign given by
52	93	a	Characteristic of pressure tendency during the three hours preceding the time of observation	WMO code table 0200
<i>Element Number</i>	<i>Character Number</i>	<i>Code</i>	<i>Element</i>	<i>Coding procedure</i>
53	94-96	ppp	Amount of pressure tendency at station level during the three hours preceding the time of observation	In tenths of hectopascal
54	97	D <sub>s</sub>	True direction of resultant displacement of the ship during the three hours preceding the time of observation	WMO code table 0700
55	98	v <sub>s</sub>	Ship's average speed made good during the three hours preceding the time of observation	WMO code table 4451
56	99-100	d <sub>w2</sub> d <sub>w2</sub>	Direction of secondary swell waves	Tens of degrees, WMO code table 0877; encoded 00 or 99 where applicable. Blanks = No observation of waves attempted
57	101-102	P <sub>w2</sub> P <sub>w2</sub>	Period of secondary swell waves	Whole seconds; encoded 99 where applicable (see under element 32)
58	103-104	H <sub>w2</sub> H <sub>w2</sub>	Height of secondary swell waves	Half-meter values (see under element 33)
59	105	c <sub>i</sub>	Concentration or arrangement of sea ice	WMO code table 0639
60	106	S <sub>i</sub>	Stage of development	WMO code table 3739
61	107	b <sub>i</sub>	Ice of land origin	WMO code table 0439
62	108	D <sub>i</sub>	True bearing of principal ice edge	WMO code table 0739
63	109	z <sub>i</sub>	Present ice situation and trend of conditions over the preceding three hours	WMO code table 5239
64	110		FM 13 code version	0 = previous to FM 24-V 1 = FM 24-V 2 = FM 24-VI Ext. 3 = FM 13-VII 4 = FM 13-VIII 5 = FM 13-VIII Ext. 6 = FM 13-IX

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				7 = FM 13-IX Ext. 8 = FM 13-X, etc.
65	111	IMMT version		0 = IMMT version just prior to version number included
being				1 = IMMT-1 (in effect from Nov. 1994) 2 = IMMT-2 (in effect from Jan. 2003) 3 = IMMT-3 (in effect from Jan. 2006) 4 = IMMT-4 (next version) etc.
66	112	Q1	Quality control indicator for (h)	0 - no quality control (QC) has been performed in this element 1 - QC has been performed; element appears to be correct 2 - QC has been performed; element appears to be inconsistent with other elements 3 - QC has been performed; element appears to be doubtful 4 - QC has been performed; element appears to be erroneous
67	113	Q2	QC indicator for (VV)	- idem -
68	114	Q3	QC indicator for (clouds: elements 12, 24–27)	- idem -
69	115	Q4	QC indicator for (dd)	- idem -
70	116	Q5	QC indicator for (ff)	- idem -
<i>Element Number</i>	<i>Character Number</i>	<i>Code</i>	<i>Element</i>	<i>Coding procedure</i>
71	117	Q6	QC indicator for (TTT)	- idem -
72	118	Q7	QC indicator for (T <sub>d</sub> T <sub>d</sub> T <sub>d</sub> )	- idem -
73	119	Q8	QC indicator for (PPPP)	- idem -
74	120	Q9	QC indicator for (weather: elements 21–23)	- idem -
75	121	Q10	QC indicator for (T <sub>w</sub> T <sub>w</sub> T <sub>w</sub> )	- idem -
76	122	Q11	QC indicator for (P <sub>w</sub> P <sub>w</sub> )	- idem -
77	123	Q12	QC indicator for (H <sub>w</sub> H <sub>w</sub> )	- idem -
78	124	Q13	QC indicator for (swell: elements 34–36, 56–58)	- idem -
79	125	Q14	QC indicator for (i <sub>R</sub> RRRt <sub>R</sub> )	- idem -
80	126	Q15	QC indicator for (a)	- idem -
81	127	Q16	QC indicator for (ppp)	- idem -
82	128	Q17	QC indicator for (D <sub>s</sub> )	- idem -
83	129	Q18	QC indicator for (v <sub>s</sub> )	- idem -
84	130	Q19	QC indicator for (t <sub>b</sub> t <sub>b</sub> t <sub>b</sub> )	- idem -
85	131	Q20	QC indicator for ships' position	- idem -

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86	132	Q21	Minimum quality control standards (MQCS)	1 = MQCS- I (Original version, Feb. 1989)CMM-X
			version identification	2 = MQCS-II ( Version 2, March 1997)
				3 = MQCS-III (Version 3, April 2000)
				4 = MQCS-IV (Version 4, June 2001)
				5 = MQCS-V (Version 5, July 2004)
				etc.

CMM-X11

SGMC-VIII

JCOMM-I

ETMC-I

### Additional Requirements for the VOSclim Project

87	133-135	HDG	Ship's heading; the direction to which the bow is pointing, referenced to true North.	(000-360); e.g. 360 = North 000 = No Movement 090 = East
88	136-138	COG	Ship's ground course; the direction the vessel actually moves over the fixed earth and referenced to True North	(000-360); e.g. 360 = North 000 = No Movement 090 = East
89	139-140	SOG	Ship's ground speed; the speed the vessel actually moves over the fixed earth.	(00-99); Round to nearest whole knot
90	141-142	SLL	Maximum height in meters of deck cargo above Summer maximum load line.	(00-99); report to nearest whole meter

*Element Character Code Element*  
*Number Number*

*Coding procedure*

91	143-145	s <sub>L</sub> hh	Departure of reference level (Summer maximum load line) from actual sea level. Consider the difference positive when the Summer maximum load line is above the level of the sea and negative if below the water line.	Position 143 (s <sub>L</sub> ) sign position; 0 = positive or zero, 1 = negative  Positions 144-145 (hh); (00-99) is the difference to the nearest whole meter between the Summer maximum load line and the sea level.
92	146-148	RWD	Relative wind direction in degrees off the bow	Relative wind direction; e.g. 000 = no apparent relative wind speed (calm on deck). Reported direction for relative wind = 001-360 degrees in a clockwise direction off the bow of the ship. When directly on the bow, RWD = 360.
93	149-151	RWS	Relative wind speed reported in units indicated by i <sub>W</sub> (knots or m/s)	Reported in either whole knots or whole meters per second (e.g. 010 knots or 005 m/s). Units established by i <sub>W</sub> as indicated in Character Number 27.

Note: Since the relative wind speed can be greater than the true wind speed e.g., i<sub>W</sub> indicates knots and ff = 98, the relative wind speed may be 101 knots; therefore, three positions must be allocated since i<sub>W</sub> cannot be adjusted and the relative wind speed converted to meters per second as is done in element 15.

94	152	Q22	Quality control indicator for (HDG)	0 - no quality control (QC) has been performed in this element 1 - QC has been performed; element appears to be correct 2 - QC has been performed; element appears to be inconsistent with other elements 3 - QC has been performed; element appears to be doubtful 4 - QC has been performed; element appears to be erroneous 5 - The value has been changed as a result of QC 6 - 8 Reserve 9 - The value of the element missing
95	153	Q23	QC indicator for (COG)	- idem -
96	154	Q24	QC indicator for (SOG)	- idem -
97	155	Q25	QC indicator for (SLL)	- idem -
98	156	Q26	QC indicator for (SL)	- idem -
99	157	Q27	QC indicator for (hh)	- idem -
100	158	Q28	QC indicator for (RWD)	- idem -
101	159	Q29	QC indicator for (RWS)	- idem -

Note: Most of the codes (groups of letters) in the IMMT format with the exception of those added for the VOSCLIM project are defined in the Manual on Codes (WMO Pub.No. 306) as they basically mirror the code groups used in FM 13-X Ship code. Because CBS was not persuaded to expand the FM 13-X Ship code for the VOSCLIM project the additional observed elements (selected codes) will not appear in WMO Manual on Codes (Pub. 306). Therefore an effort was made to select unique codes (groups of letters) not defined in WMO Pub. 306 for the elements added to the IMMT-2 format version modified for the VOSCLIM project. This was deliberately done to try and prevent a difference in meaning for a given code group (identical symbolic letters) in Pub. 306 versus that in IMMT. Presumably none of the Character Code formats will be altered in the future by CBS.

## Annex 2 to Recommendation 9 (JCOMM-II)

### AMENDMENTS TO THE *MANUAL ON MARINE METEOROLOGICAL SERVICES AND GUIDE TO MARINE METEOROLOGICAL SERVICES*

#### MINIMUM QUALITY CONTROL STANDARDS

MQCS-V (Version 5, June 2004)

Δ = space (ASCII 32)

Element	Error	Action
1	i <sub>T</sub> ≠ 3 – 5, Δ	Correct manually otherwise = Δ
2	AAAA ≠ valid year	Correct manually otherwise reject
3	MM ≠ 01 - 12	Correct manually otherwise reject
4	YY ≠ valid day of month	Correct manually otherwise reject
5	GG ≠ 00 - 23	Correct manually otherwise reject
6	Q ≠ 1, 3, 5, 7	Correct manually and Q <sub>20</sub> = 5, otherwise Q <sub>20</sub>



= 4	7	$Q = \Delta$ $L_a L_a L_a \neq 000-900$	$Q_{20} = 2$ Correct manually and $Q_{20} = 5$ , otherwise $Q_{20}$
	8	$L_a L_a L_a = \Delta \Delta \Delta$ $L_o L_o L_o L_o \neq 0000-1800$	$Q_{20} = 2$ Correct manually and $Q_{20} = 5$ , otherwise $Q_{20}$
= 4		$L_o L_o L_o L_o = \Delta \Delta \Delta \Delta$ $L_a L_a L_a = L_o L_o L_o L_o = \Delta \Delta \Delta (\Delta)$	$Q_{20} = 2$ Correct manually otherwise reject

**Time sequence checks**

		Change in latitude $> 0.7^\circ$ /hr	Correct manually otherwise $Q_{20} = 3$
		Change in longitude $> 0.7^\circ$ /hr when lat. 00-39.9	Correct manually otherwise $Q_{20} = 3$
		Change in longitude $> 1.0^\circ$ /hr when lat. 40-49.9	Correct manually otherwise $Q_{20} = 3$
		Change in longitude $> 1.4^\circ$ /hr when lat. 50-59.9	Correct manually otherwise $Q_{20} = 3$
		Change in longitude $> 2.0^\circ$ /hr when lat. 60-69.9	Correct manually otherwise $Q_{20} = 3$
		Change in longitude $> 2.7^\circ$ /hr when lat. 70-79.9	Correct manually otherwise $Q_{20} = 3$
4	9		No checking
	10	$h \neq 0-9, \Delta$	Correct manually and $Q_1 = 5$ , otherwise $Q_1 =$
4		$h = \Delta$	$Q_1 = 9$
	11	$VV \neq 90-99, \Delta \Delta$	Correct manually and $Q_2 = 5$ , otherwise $Q_2 =$
4		$VV = \Delta \Delta$	$Q_2 = 9$
	12	$N \neq 0-9, \Delta, \Delta$	Correct manually and $Q_3 = 5$ , otherwise $Q_3 =$
2		$N < N_h$	Correct manually and $Q_3 = 5$ , otherwise $Q_3 =$
	13	$dd \neq 00-36, 99$ $dd = \Delta \Delta, \Delta \Delta$ <u>dd versus ff</u> $dd = 00, ff \neq 00$  $dd \neq 00, ff = 00$	Correct manually and $Q_4 = 5$ , otherwise $Q_4 = 4$ $Q_4 = 9$  Correct manually and $Q_4$ or $Q_5 = 5$ otherwise $Q_4 = Q_5 = 2$ Correct manually and $Q_4$ or $Q_5 = 5$ otherwise $Q_4 = Q_5 = 2$

Element	Error	Action
3	14 $i_W \neq 0, 1, 3, 4$	Correct manually, otherwise $Q_5 = Q_{29} = 4$
	15 $ff > 80$ knots	Correct manually and $Q_5 = 5$ , otherwise $Q_5 =$
	$ff = \Delta \Delta, \Delta \Delta$	$Q_5 = 9$
	16 $s_n \neq 0, 1$	Correct manually, otherwise $Q_6 = 4$
	17 $TTT = \Delta \Delta \Delta, \Delta \Delta \Delta$ If $-25 > TTT > 40$ then when Lat. $< 45.0$ $TTT < -25$ $TTT > 40$ when Lat. $\geq 45.0$ $TTT < -25$ $TTT > 40$	$Q_6 = 9$   $Q_6 = 4$ $Q_6 = 3$  $Q_6 = 3$ $Q_6 = 4$

**TTT versus humidity parameters**

	TTT < WB (wet bulb)	Correct manually and $Q_6 = 5$ , otherwise $Q_6 =$
$Q_{19} = 2$	TTT < DP (dew point)	Correct manually and $Q_6 = Q_7 = 5$ , otherwise
$Q_6 =$		$Q_7 = 2$
18	$s_t \neq 0, 1, 2, 5, 6, 7$	Correct manually, otherwise $Q_7 = 4$
19	DP > WB	Correct manually and $Q_7 = 5$ , otherwise $Q_7 =$
$Q_{19} = 2$		
$Q_6 = 2$	DP > TTT	Correct manually and $Q_7 = 5$ , otherwise $Q_7 =$
	WB = DP = $\Delta \Delta \Delta$	$Q_7 = 9$
20	930 > PPPP > 1050 hPa	Correct manually and $Q_8 = 5$ , otherwise $Q_8 =$
3		
	870 > PPPP > 1070 hPa	Correct manually and $Q_8 = 5$ , otherwise $Q_8 =$
4		
	PPPP = $\Delta \Delta \Delta \Delta$	$Q_8 = 9$
21	ww = 22-24, 26, 36-39, 48, 49, 56, 57, 66-79, 83-88	Correct manually and $Q_9 = 5$ , otherwise $Q_9 = 4$
	93-94	Correct manually and $Q_9 = 5$ , otherwise $Q_9 =$
3		
	and latitude < 20°	
	if $i_x = 7$ :	
	$w_a w_a = 24 - 25, 35, 47 - 48,$	Correct manually and $Q_9 = 5$ , otherwise
	54-56, 64-68, 70-78, 85-87	$Q_9 = 4$
	and latitude < 20°	
22, 23	$W_1$ or $W_2 = 7$ and latitude < 20°	Correct manually and $Q_9 = 5$ , otherwise $Q_9 = 4$
	$W_1 < W_2$	Correct manually and $Q_9 = 5$ , otherwise $Q_9 =$
2		
	$W_1 = W_2 = ww = \Delta \Delta \Delta \Delta$	$Q_9 = 9$
24-27	$N = 0$ , and $N_h C_L C_M C_H \neq 0000$	Correct manually and $Q_3 = 5$ , otherwise $Q_3 =$
2		
	$N = \Delta$ , and $N_h C_L C_M C_H \neq \Delta \Delta \Delta \Delta$	Correct manually and $Q_3 = 5$ , otherwise $Q_3 =$
2		
	$N = 9$ , and not ( $N_h = 9$ and	Correct manually and $Q_3 = 5$ , otherwise $Q_3 =$
2		
	$C_L C_M C_H = \Delta \Delta \Delta$ )	
	$N = \Delta$ , and $N_h C_L C_M C_H = \Delta \Delta \Delta \Delta$	$Q_3 = 9$
28	$s_n \neq 0, 1$	Correct manually otherwise $Q_{10} = 4$
29	$T_W T_W T_W = \Delta \Delta \Delta, \Delta \Delta \Delta$	$Q_{10} = 9$
	if $-2.0 > T_W T_W T_W > 37.0$ then	
	when Lat. < 45.0	
	$T_W T_W T_W < -2.0$	Control manually and $Q_{10} = 5$ , otherwise $Q_{10} =$
4		
	$T_W T_W T_W > 37.0$	Control manually and $Q_{10} = 5$ , otherwise $Q_{10} =$
3		
	when Lat. $\geq 45.0$	
	$T_W T_W T_W < -2.0$	Control manually and $Q_{10} = 5$ , otherwise $Q_{10} =$
3		
	$T_W T_W T_W > 37.0$	Control manually and $Q_{10} = 5$ , otherwise $Q_{10} =$
4		

Element	Error	Action
30	Indicator $\neq$ 0-7, $\Delta$	Correct manually, otherwise $\Delta$
31	Indicator $\neq$ 0-9, $\Delta$	Correct manually, otherwise $\Delta$
32	$20 < P_W P_W < 30$ $P_W P_W \geq 30$ and $\neq 99$ $P_W P_W = \Delta\Delta, \#$	$Q_{11} = 3$ $Q_{11} = 4$ $Q_{11} = 9$
33	$35 < H_W H_W < 50$ $H_W H_W \geq 50$ $H_W H_W = \Delta\Delta, \#$	$Q_{12} = 3$ $Q_{12} = 4$ $Q_{12} = 9$
= 4	34 $d_{w1} d_{w1} \neq 00-36, 99, \Delta\Delta$	Correct manually and $Q_{13} = 5$ , otherwise $Q_{13}$
	swell <sub>1</sub> = swell <sub>2</sub> = $\Delta$	$Q_{13} = 9$
	35 $25 < P_{w1} P_{w1} < 30$ $P_{w1} P_{w1} \geq 30$ and $\neq 99$	$Q_{13} = 3$ $Q_{13} = 4$
	36 $35 < H_{w1} H_{w1} < 50$ $H_{w1} H_{w1} \geq 50$	$Q_{13} = 3$ $Q_{13} = 4$
37	$I_S \neq 1-5, \Delta$	Correct manually, otherwise $\Delta$
38	$E_S E_S \neq 00-99, \Delta\Delta$	Correct manually, otherwise $\Delta\Delta$
39	$R_S \neq 0-4, \Delta$	Correct manually, otherwise $\Delta$
40	Source $\neq$ 0-6	Correct manually, otherwise $\Delta$
41	Platform $\neq$ 0-9	Correct manually, otherwise $\Delta$
42	No call sign	Insert manually, mandatory entry
43	No country code	Insert manually
44		No Quality Control
45	$Q \neq 0-6, 9$	Correct manually, otherwise $\Delta$
46	$i_X \neq 1-7$	Correct manually, otherwise $\Delta$
47	$i_R = 0-2$ and $RRR = 000, \#, \Delta\Delta\Delta$ $i_R = 3$ and $RRR \neq \#, \Delta\Delta\Delta$ $i_R = 4$ and $RRR \neq \#, \Delta\Delta\Delta$ $i_R \neq 0-4$	Correct manually, otherwise $Q_{14} = 4$ Correct manually, otherwise $Q_{14} = 2$ Correct manually, otherwise $Q_{14} = 2$ Correct manually, otherwise $Q_{14} = 4$
= 2	48 $RRR \neq 001 - 999$ and $i_R = 1, 2$	Correct manually and $Q_{14} = 5$ , otherwise $Q_{14}$
	49 $t_R \neq 0-9, \Delta$	Correct manually and $Q_{14} = 5$ , otherwise $Q_{14} =$
4	50 $s_W \neq 0, 1, 2, 5, 6, 7$	Correct manually, otherwise $Q_{19} = 4$
	51 $WB < DP$	Correct manually and $Q_{19} = 5$ , otherwise $Q_{19} = Q_7 = 2$
	$WB = \#, \Delta\Delta\Delta$ $WB > TTT$	$Q_{19} = 9$ Correct manually and $Q_{19} = 5$ , otherwise $Q_{19}$
= $Q_6 = 2$		
= 4	52 $a \neq 0-8, \Delta$	Correct manually and $Q_{15} = 5$ , otherwise $Q_{15}$
	$a = 4$ and $ppp \neq 000$	Correct manually and $Q_{15}$ or $Q_{16} = 5$ ,
	$a = 1, 2, 3, 6, 7, 8$ and $ppp = 000$	$Q_{15} = Q_{16} = 2$ Correct manually and $Q_{15}$ or $Q_{16} = 5$ ,
	otherwise	$Q_{15} = Q_{16} = 2$ $Q_{15} = 9$

3	53	$250 \geq ppp > 150$	Correct manually and $Q_{16} = 5$ , otherwise $Q_{16} =$
		$ppp > 250$	Correct manually and $Q_{16} = 5$ otherwise $Q_{16} =$
4		$ppp = \Delta\Delta\Delta$	$Q_{16} = 9$
4	54	$D_s \neq 0-9, \Delta, /$	Correct manually and $Q_{17} = 5$ , otherwise $Q_{17} =$
		$D_s = \Delta, /$	$Q_{17} = 9$

Element	Error	Action	
= 4	55	$V_s \neq 0-9, \Delta, /$	Correct manually and $Q_{18} = 5$ , otherwise $Q_{18}$
		$V_s = \Delta, /$	$Q_{18} = 9$
= 4	56	$d_{w2}d_{w2} \neq 00-36, 99, \Delta\Delta$	Correct manually and $Q_{13} = 5$ , otherwise $Q_{13}$
	57	$25 < P_{w2}P_{w2} < 30$ $P_{w2}P_{w2} \geq 30$ and $\neq 99$	$Q_{13} = 3$ $Q_{13} = 4$
	58	$35 < H_{w2}H_{w2} < 50$ $H_{w2}H_{w2} \geq 50$	$Q_{13} = 3$ $Q_{13} = 4$
	59	$c_i \neq 0-9, \Delta, /$	Correct manually, otherwise $\Delta$
	60	$S_i \neq 0-9, \Delta, /$	Correct manually, otherwise $\Delta$
	61	$b_i \neq 0-9, \Delta, /$	Correct manually, otherwise $\Delta$
	62	$D_i \neq 0-9, \Delta, /$	Correct manually, otherwise $\Delta$
	63	$z_i \neq 0-9, \Delta, /$	Correct manually, otherwise $\Delta$

86	Minimum Quality Control CMM-X Standards (MQCS) version XII identification VIII	1= MQCS-I (Original version, Feb. 1989) 2= MQCS-II (Version 2, March 1997) CMM- 3= MQCS-III (Version 3, April 2000) SGMC- 4= MQCS-IV (Version 4, June 2001) JCOMM-I 5= MQCS-V (Version 5, July 2004) ETMC-I
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87	$HDG \neq 000-360$ 4 $HDG = \Delta\Delta\Delta, ##$	correct manually and $Q_{22} = 5$ , otherwise $Q_{22} =$ $Q_{22} = 9$
88	$COG \neq 000-360$ 4 $COG = \Delta\Delta\Delta, ##$	correct manually and $Q_{23} = 5$ , otherwise $Q_{23} =$ $Q_{23} = 9$
89	$SOG \neq 00 - 99$ 4 $SOG = \Delta\Delta, ##$ $SOG > 33$	correct manually and $Q_{24} = 5$ , otherwise $Q_{24} =$ $Q_{24} = 9$ correct manually and $Q_{24} = 5$ , otherwise $Q_{24} =$

90	SLL ≠ 00-99 4 SLL = ΔΔ,## SLL > 32 3	correct manually and Q <sub>25</sub> = 5, otherwise Q <sub>25</sub> = Q <sub>25</sub> = 9 correct manually and Q <sub>25</sub> = 5, otherwise Q <sub>25</sub> =
91	s <sub>L</sub> ≠ 0,1 4 s <sub>L</sub> = Δ,## hh ≠ 00 – 99 4 hh = ΔΔ,## hh >= 13 3 hh < -01 4	correct manually and Q <sub>26</sub> = 5, otherwise Q <sub>26</sub> = Q <sub>26</sub> = 9 correct manually and Q <sub>27</sub> = 5, otherwise Q <sub>27</sub> = Q <sub>27</sub> = 9 correct manually and Q <sub>27</sub> = 5, otherwise Q <sub>27</sub> = correct manually and Q <sub>27</sub> = 5, otherwise Q <sub>27</sub> =
92	RWD ≠ 000 - 360, 999 4 RWD = ΔΔΔ,##	correct manually and Q <sub>28</sub> = 5, otherwise Q <sub>28</sub> = Q <sub>28</sub> = 9
93	RWS ≠ 000 - 999 4 RWS = ΔΔΔ,## RWS > 110 kts 3	correct manually and Q <sub>29</sub> = 5, otherwise Q <sub>29</sub> = Q <sub>29</sub> = 9 correct manually and Q <sub>29</sub> = 5, otherwise Q <sub>29</sub> =

Element	Error	Action
	RWD versus RWS RWD = 000, RWS ≠ 000 otherwise	correct manually and Q <sub>28</sub> or Q <sub>29</sub> = 5, Q <sub>28</sub> = Q <sub>29</sub> = 2
	RWD ≠ 000, RWS = 000 otherwise	correct manually and Q <sub>28</sub> or Q <sub>29</sub> = 5, Q <sub>28</sub> = Q <sub>29</sub> = 2

### Specifications for quality control Indicators Q<sub>1</sub> to Q<sub>29</sub>

0	No quality control (QC) has been performed on this element
1	QC has been performed; element appears to be correct
2	QC has been performed; element appears to be inconsistent with other elements
3	QC has been performed; element appears to be doubtful

- 4 QC has been performed; element appears to be erroneous
- 5 The value has been changed as a result of QC
- 6 reserved for GCC
- 7 reserved for GCC
- 8 Reserve
- 9 The value of the element is missing